Sleep Patterns Analysis Using Polysomnography: A Comparison Between Active and Sedentary Male

Jagdeep Kaur [1], Dr. Nishan Singh Deol [2], Balkar Singh [3]

[1] *Assistant Professor in Physical Education, Prof. Gursewak Singh Govt. College of Physical Education, Patiala. Corresponding Email: jagdeepk1007@gmail.com*
[2] *Professor, Department of Physical Education, Punjabi University, Patiala. Email: drnsdeol@gmail.com*
[3] *PhD Scholar, Department of Physical Education, Punjabi University, Patiala. Email: balkarsidhu23048@gmail.com*

KEYWORDS

Total sleep time (TST), Sleep onset latency (SOL), Sleep Efficiency (SE), Wake after sleep onset (WASO) Polysomnography, Active male, Sedentary male.

ABSTRACT

While there is a rising focus on sleep issues among population, a notable gap exists in the comparative analyses of sleep patterns between Active and Sedentary Male. The purpose of this study is to investigate and compare sleep patterns and polysomnography measures between active and sedentary men. Total ten male participants were randomly selected to fulfill the purpose of the study. All the participants were in the age group 18-25 only. The selected variable, i.e. Total sleep time (TST), sleep onset latency (SOL), sleep efficiency (SE) and wake after sleep onset (WASO) was measured by RMS Quest 24/32 channel polysomnography machine. The obtained data were analyzed by applying independent t-test to identify the significant difference. An α-value <0.05 was considered statistically significant. Results indicate that significant difference were found in selected variables as total sleep time (TST) of active and sedentary male, as the p-value (000) was < 0.05, a significant difference in the sleep onset latency (SOL) of active and sedentary male, as the p-value (000) was < 0.05, a significant difference in the wake after sleep onset (WASO) of active and sedentary male, as the p-value (000) was < 0.05, also a significant difference in the sleep efficiency (SE) of active and sedentary male, as the p-value (000) was < 0.05, at 5% level of significance.

1. Introduction

A vital portion of ensuring the body is always working at its best is sleep, which is regarded as one of the most miraculous gifts from nature to mankind. Rejuvenating tired bodies is no easy task, but it is a necessary prerequisite for recharging one's energy stores. Sleep may be clearly defined by its unique physiological and behavioral characteristics that differentiate it from awake. The occurrence of both REM and non-REM sleep is defined by these factors taken together. Stages 1, 2, 3, and 4 make up NREM sleep according to the system proposed by Rechtschaffen and Kales. At each level, unique EEG patterns are shown. Exercising regularly is associated with lower stress and anxiety levels, which in turn improves the quality of sleep. Regular physical exercise was linked to reduced stress and improved sleep quality among teenagers. Exercising may change the structure of your sleep, according to studies. One effect is that it makes you sleep more deeply and with slower waves. In elderly persons who suffer from insomnia found that moderate-intensity aerobic exercise improved both the duration and quality of their sleep. Extensive research has shown that maintaining a regular exercise routine improves the quality of sleep. For instance, exercise greatly enhanced total sleep quality and decreased sleep disruptions across different groups. There is evidence that physical activity may alleviate the difficulties associated with sleeplessness.

2. Methodology

Participants in the study

The purpose of this research was to examine the differences in polysomnography parameters between physically active and inactive male. Ten active and sedentary male were randomly selected to fulfill the purpose of the study. Two equal groups of active and sedentary men were formed. All the subjects were in the age group of 18-25 only.

Variables of the study

Table-1 Variables and unit of measurement of polysomnography variables

Sr. no	Variables	Unit of Measurement	Meaning
1	Total sleep Time (TST)	Minute/%	Total sleep time includes the time from sleep onset to sleep offset and is distributed in the sleep time as minutes of stage 1 sleep, stage 2 sleep, stage 3 sleep, and rapid eye movement sleep.

2	Sleep onset latency (SOL)	Minute/%	The duration of time between when the lights are turned off as the subject attempts to sleep, until the time subject actually falls asleep as demonstrated by the EEG.
3	Sleep efficiency (SE)	Percentage	The percentage of time a person sleeps, in relation to the amount of time a person spends in bed. The percentage is calculated by dividing the total sleep time by total time in bed.
4	Wake after sleep onset (WASO)	Minute/%	It refers to periods of wakefulness occurring after defined sleep onset latency.

Criterion Measures

Total Sleep Time (TST), Sleep Onset Latency (SOL), Sleep Efficiency (SE), Wake After Sleep Onset (WASO) of active and Sedentary Male were measured by using an RMS Quest 24/32 channel polysomnography machine.

Procedure of overnight polysomnography

In the physiology lab of the physical education department at Punjabi University Patiala, each participant recorded their polysomnography throughout the night in order to gather data. Over the course of five consecutive nights, every individual was tested. Computerized methods were used to create the usual polysomnography recordings taken at night. Every recording started at the usual time the subjects went to bed and ended at the usual time they woke up. The sleep was recorded using an RMS Quest 24/32 channel polysomnography machine.

Statistical analyses

An independent t-test was used to mean values after data collection for the Analysis of polysomnography variables between active and sedentary Males. An α-value <0.05 was considered statistically significant.

Table 2. Comparison of Mean and SD Values of Total sleep time (Minute) Variable between Active and Sedentary Male

Group	Mean	SD	t-value	Sig.
Active Male	395.68	4.42	21.978	.000
Sedentary Male	346.54	2.33		

t0.05 (8) = 2.306

Table 2 shows a highly significant difference in total sleep time between active and sedentary male, as shown by the t-value of 395.68 for active males and a significance level (Sig.) of.000. Typically, for a certain degree of freedom, we would compare the t-value to the crucial value (t0.05) in order to get more meaning. But there is a substantial difference for sedentary male, as shown by the crucial value (t0.05 (8) = 2.306). When comparing active and sedentary men, the mean total sleep time for the former is much lower. The total sleep time of active male is more constant (higher SD) than that of sedentary males. There is a statistically significant difference in the mean total sleep time between active and sedentary Male.

Table 3. Comparison of Mean and SD Values of sleep onset latency (Minute) Variable between Active and Sedentary Males

Group	Mean	SD	t-value	Sig.
Active Males	20.95	.37	52.451	.000
Sedentary Males	35.96	.52		

t0.05 (8) = 2.306

Table 3 shows that at the.000 level of significance, the t-value for active male is 52.451, indicating that there is a very significant difference in the amount of time spent in sleep onset latency compared to sedentary males. When comparing active and sedentary men, the mean sleep onset latency

duration for the former is much lower. There seems to be a little more variation in the length of sleep onset latency among active male, since their standard deviation in this area is somewhat lower than that of sedentary males. There is a statistically significant difference in the mean length of sleep onset latency between men who are physically active and those who are not, suggesting that the amount of physical activity may influence lower the sleep onset latency.

Table 4. Comparison of Mean and SD Values of sleep efficiency (percentage) Variable between Active and Sedentary Male

Group	Mean	SD	t-value	Sig.
Active Male	88.41	.81	25.452	.000
Sedentary Male	77	.59		

t0.05 (8) = 2.306

Table 4 shows that a t-value of 25.452 and a Sig. of.000, the difference in sleep efficiency duration between active and sedentary males is very significant. Sleep efficiency time percentage variability is more pronounced in active guys, as shown by a greater standard deviation compared to sedentary males. There is a statistically significant difference in the mean length of sleep efficiency time percentage between men who are physically active and those who are not, suggesting that the amount of physical activity may influence its duration.

Table 5. Comparison of Mean and SD Values of wake after sleep onset (Minute) Variable between Active and Sedentary Male

Group	Mean	SD	t-value	Sig.
Active Male	31.32	1.20	13.907	.000
Sedentary Male	42.86	1.42		

t0.05 (8) = 2.306

Table 5 shows that there is a very significant difference in wake after sleep onset latency between active and sedentary male, as shown by the t-value of 13.907 and a significance level (Sig.) of.000. Sedentary men get much more wake after sleep onset latency (WASOL) sleep than active men. It seems that there is a little greater variability in the length of wake after sleep onset latency sleep among sedentary guys, since their SD is somewhat larger than that of active males. Sedentary men, on average, had longer wake after sleep onset latency sleep duration than active men, suggesting that physical activity level affects this length. The difference between the two groups is statistically significant.

3. Discussion Of Findings

The results of the study showed that there was significant difference in Total Sleep Time (TST) variable (t = -21.798, p = .000) between Active and Sedentary male at 0.05 level of significance. Active persons were having higher total sleep time. It can be due to the reason that active persons need more recovery because they spend time in physical activity. These results of the present study confirmed with the findings of Guimares et al. (2008) who reported significant difference in Total Sleep Time (TST) between active and sedentary male.The results of the study showed that there was significant difference in Sleep Onset Latency (SOL) variable (t = -52.451, p = .000) between Active and Sedentary male at 0.05 level of significance. Active persons were having lower sleep onset latency. It can be due to the reason that their tiredness which occurs due to the physical activity helps them to go to sleep as early as possible. These findings of the study are confirmed with the findings of Hague et al. (2003) who reported significant difference in Sleep Onset Latency (SOL) between active and sedentary male.The results of the study showed that there was significant difference in Sleep Efficiency (SE) variable (t = -25.452, p = .000) between Active and Sedentary male at 0.05 level of significance. Active persons were having higher sleep efficiency. It can be due to the reason

that active persons take more total sleep time for the completion of recovery process to repair those cellular damages which they got during in physical activity. These results of the present study confirmed with the findings of Gubelmann et al. (2018) who reported significant difference in Sleep Efficiency (SE) between active and sedentary male.The results of the study showed that there was significant difference in Wake After Onset Latency (WAOL) variable (t = -13.907, p = .000) between Active and Sedentary male at 0.05 level of significance. Active persons were having lower wake after onset latency. It can be sure to the reason that once active persons have gone to sleep then there are less chances of interruptions by their own mind. These results of the present study confirmed with the findings of Guimares et al. (2008) who reported significant difference in Wake After Onset Latency (WAOL) time between active and sedentary male.

4. Conclusion

According to the results, polysomnography variables change significantly between active and sedentary men. Regular exercise seems to improve sleep architecture, with benefits such as a quicker time to deep sleep and longer time in deep sleep. However, it seems that sedentary behaviors affect the length of total sleep time. Sedentary males, for example, tend to have longer wake after sleep onset latency. As a result, encouraging men to lead more physically active lives may help them get a better night's rest. In order to better understand how physical exercise affects, sleep patterns and how to help sedentary people get a better night's rest, further study is needed.

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